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09/847,091	05/01/2001	Eric Arthur Swanson	SYCS-042 (P96)	5732

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EXAMINER	
KIM, DAVID S	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/847,091	SWANSON, ERIC ARTHUR	
	Examiner	Art Unit	
	David S. Kim	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Wright et al.

2. **Claims 1, 5-8, and 11** are rejected under 35 U.S.C. 102(a) as being anticipated by Wright et al. (UK Patent Application GB 2350001 A, hereinafter "Wright").

Regarding claim 1, Wright discloses:

An optical sub-assembly for processing an optical signal, the sub-assembly comprising:

a working path of the optical network (e.g., working path between node A and node C in Fig. 9A);

a first sub-band (working lower wavelengths) of the optical signal carried only by the working path;

a protect path (e.g., protection path between node A and node C in Fig. 9B, dotted lines) of the optical network configured to protect the working path;

a second sub-band (protection upper wavelengths) of the optical signal carried only by the protect path;

a first module (node D) disposed along the working path for affecting the working path; and

a second module (node B) disposed along the protect path for affecting the protect path;

wherein wavelengths of the optical signal of the first sub-band are non-overlapping (one band is in a lower range and the other band is in a higher range) with wavelengths of the optical signal of the second sub-band.

Regarding claims 5-8 and 11, Wright discloses:

The sub-assembly of claim 1, wherein the first and second modules are comprised of:

(**claim 5**) channel add devices (OADM for adding wavelengths in Fig. 10 in the nodes of Fig. 9).

(**claim 6**) channel drop devices (OADM for dropping wavelengths in Fig. 10 in the nodes of Fig. 9).

(**claim 7**) demultiplexers (OADM for demultiplexing wavelengths in Fig. 10 in the nodes of Fig. 9).

(**claim 8**) multiplexers (OADM for multiplexing wavelengths in Fig. 10 in the nodes of Fig. 9).

(**claim 11**) dispersion compensation modules (wavelength converters in Fig. 10 in the nodes of Fig. 9 are used for dispersion compensation, p. 18, l. 3-10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Wright et al. as primary reference

4. **Claim 2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Duerksen et al. (U.S. Patent No. 6,307,986 B1, hereinafter "Duerksen").

Regarding claim 2, Wright does not expressly disclose:

The sub-assembly of claim 1, wherein the first sub-band is one of a C-band and an L-band, and the second sub-band is the other of a C-band and an L-band.

However, these bands are well known in the art. Duerksen teaches such a usage of these bands for working and protection purposes (col. 6, l. 6-8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ these bands for working and protection purposes. One of ordinary skill in the art would have been motivated to do this since one can easily and intuitively notice that these bands together constitute a set of lower wavelengths and upper wavelengths, so they fit as possible wavelengths for use in the apparatus of Wright.

5. **Claims 3-4 and 9-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright.

Regarding claims 3-4 and 9-10, Wright does not expressly disclose the following limitations, but the limitations are well known in the art:

The sub-assembly of claim 1, wherein the first and second modules are comprised of:

(**claim 3**) optical amplifiers (nodes in Fig. 9 often contain optical amplifiers to compensate for propagation losses).

(**claim 4**) band pass filters (many types of OADMs in Fig. 10 in the nodes of Fig. 9 employ band pass filters to isolate desired wavelength channels).

(**claim 9**) interleavers (many types of OADMs in Fig. 10 in the nodes of Fig. 9 employ interleavers to isolate desired wavelength channels).

(**claim 10**) attenuators (nodes in Fig. 9 often contain attenuators to equalize the power spectrum of the multi-wavelength signals that pass through them).

Yang et al. as primary reference

6. **Claims 1-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. ("New generation of amplifiers arrives for optical networking," hereinafter "Yang") in view of Touma et al. (U.S. Patent No. 6,288,809 B1, hereinafter "Touma") and Duerksen.

Regarding claims 1-24, consider the communication system teachings in Fig. 1 of Yang, modified by the fault recovery teachings in the figures of Touma, e.g., Fig. 1, further modified by the wavelength usage teachings of Duerksen, col. 6, l. 6-8.

The system of Yang (Fig. 1) employs two bands of wavelengths for transmission channels, the C-band and the L-band. However, Yang is silent about how to deal with faults that may impair its system. Touma speaks into this silence by showing the use of one wavelength (1.3 microns) for a working channel and another wavelength (1.5 microns) for a corresponding protection channel. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to apply these wavelength teachings of Touma in the system of Yang. One of ordinary skill in the art would have been motivated to do this to provide fault recovery protection (Touma, col. 2, l. 55-62) to the system of Touma.

The system of Yang in view of Touma would then employ a set of wavelengths for working channels and a different set of wavelengths for corresponding protection channels. However, one question that would arise would be, "What would be a suitable arrangement of wavelengths for these two sets of channels?" Duerksen provides some suitable arrangements: C-band working channels paired with L-band protection channels or vice versa (col. 6, l. 6-8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement a wavelength arrangement of Duerksen in the system of Yang in view of Touma. One of ordinary skill in the art would have been motivated to do this since Duerksen's plain teaching of this arrangement (col. 6, l. 6-8) makes it self-evident that it is a reasonable and viable implementation of two sets of different wavelengths for working and protection channels. Moreover, the broad scope of the general fault recovery teachings of Touma suggests that any arbitrary selection of two different sets of wavelengths would seem reasonable to one of ordinary skill in the art, such as the selection of Duerksen.

In view of the combination above, Yang in view of Touma and Duerksen discloses:

(**claim 1**) An optical sub-assembly for processing an optical signal, the sub-assembly comprising:

a working path of the optical network (e.g., Yang, working path through the C-band amplifiers in Fig. 1);

a first sub-band (Yang, C-band) of the optical signal carried only by the working path;

a protect path (e.g., Yang, protection path through L-band amplifiers in Fig. 1) of the optical network configured to protect the working path (Touma's protection scheme with Duerksen's wavelength arrangement);

a second sub-band (Yang, L-band) of the optical signal carried only by the protect path;

a first module (Yang, any module along the transmission path in Fig. 1; e.g., C-band amplifier) disposed along the working path for affecting the working path; and

a second module (Yang, any module along the transmission path in Fig. 1; e.g., L-band amplifier) disposed along the protect path for affecting the protect path;

wherein wavelengths of the optical signal of the first sub-band are non-overlapping (the C-band and the L-band do not overlap) with wavelengths of the optical signal of the second sub-band.

(**claim 2**) The sub-assembly of claim 1, wherein the first sub-band is one of a C-band and an L-band, and the second sub-band is the other of a C-band and an L-band (C-band and L-band in Duerksen and Yang).

(**claim 3**) optical amplifiers (Yang, amplifiers in Fig. 1).

(**claim 4**) band pass filters (dual band repeaters like the one in Fig. 1 of Yang often employ band pass filters to isolate the desired band to amplify).

(**claim 5**) channel add devices (Yang, section "From SONET to WDM", add/drop multiplexers).

(**claim 6**) channel drop devices (Yang, section "From SONET to WDM", add/drop multiplexers).

(**claim 7**) demultiplexers (Yang, demultiplexers in Receiver of Fig. 1; section "From SONET to WDM", add/drop multiplexers drop channels by demultiplexing the desired channel to drop).

(**claim 8**) multiplexers (Yang, multiplexers in Transmitter of Fig. 1; section "From SONET to WDM", add/drop multiplexers).

(**claim 9**) interleavers (Yang, the junction before the amplifiers in Repeater of Fig. 1 interleaves the C-band and L-band onto two different paths).

(**claim 10**) attenuators (in-line attenuators are common components to equalize the power spectrum of the multi-wavelength signals that pass through them).

(**claim 11**) dispersion compensation modules (Yang, section "From SONET to WDM", in-line "dispersion-compensating elements" are common components for each channel).

(**claim 12**) A method of processing an optical signal in an optical network, comprising the steps of:

separating (Yang, the junction before the amplifiers in Repeater of Fig. 1 separates the C-band and the L-band) the optical signal into a first sub-band (C-band) supporting only a working path (C-band path in Fig. 1 of Yang) and a second sub-band (L-band) supporting only a protect path (L-band path in Fig. 1 of Yang) configured to protect the working path (Touma's protection scheme with Duerksen's wavelength arrangement);

routing the first sub-band through a first module (e.g., C-band path components in Fig. 1 of Yang) to form the working path and routing the second sub-band through a second module (e.g., L-band path components in Fig. 1 of Yang) of the same type as the first module to form the protect path; and

recombining the first and second sub-bands (Yang, junction after the amplifiers in Repeater of Fig. 1 recombines the C-band and the L-band);

wherein wavelengths of the optical signal of the first sub-band are non-overlapping (C-band and L-band are non-overlapping) with wavelengths of the optical signal of the second sub-band.

(**claim 13**) The method of claim 12, wherein the separating step comprises the step of routing the optical signal through an L/C splitter (Yang, the junction before the amplifiers in Repeater of Fig. 1 splits the C-band and the L-band).

(**claims 15-23**) Claims 15, 16, 17, 18, 19, 20, 21, 22, and 23 are method claims that correspond to apparatus claims 3, 4, 5, 6, 7, 8, 9, 10, and 11, respectively. Therefore, the recited means in apparatus claims 3-11 read on the corresponding steps in method claims 15-23.

(**claim 24**) An optical amplifier node for amplifying an optical signal, the amplifier node comprising:

a first amplifier (Yang, C-band amplifiers) for amplifying only signals from a first sub-band (C-band) of the optical signal, wherein the signals are carried only by a working path (C-band path); and

a second amplifier (Yang, L-band amplifiers) for amplifying only signals from a second sub-band (L-band) of the optical signal, wherein the signals are carried only by a protect path (L-band path) configured to protect the working path (Touma's protection scheme with Duerksen's wavelength arrangement);

wherein wavelengths of the optical signal of the first sub-band are non-overlapping (C-band and L-band are non-overlapping) with wavelengths of the optical signal of the second sub-band.

(**claim 25**) The optical amplifier node of claim 24, further comprising a sub-band splitter (Yang, the junction before the amplifiers in Repeater of Fig. 1 splits the C-band and the L-band) for splitting the optical signal into at least two sub-bands.

(**claim 26**) The optical amplifier node of claim 25, wherein the sub-band splitter is an L/C splitter (Yang, the junction before the amplifiers in Repeater of Fig. 1 splits the C-band and the L-band).

(**claim 27**) The optical amplifier node of claim 24, further comprising a sub-band combiner for combining at least two sub-bands into the optical signal (Yang, junction after the amplifiers in Repeater of Fig. 1 combines the C-band and the L-band).

(**claim 28**) The optical amplifier node of claim 27, wherein the sub-band combiner is an L/C combiner (Yang, junction after the amplifiers in Repeater of Fig. 1 combines the C-band and the L-band).

Response to Arguments

7. Applicant's arguments, see p. 6-7, filed on 19 August 2005, with respect to the rejection(s) of the claims under the admitted prior art in view of Ramaswami et al. have been fully considered. Applicant's arguments are based on new limitations introduced into the claims by amendment. The previous rejection does not adequately address these limitations. Thus, Applicant's arguments are persuasive. Therefore, the previous rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly discovered references to Wright, Yang, Touma, and Duerksen.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lauder et al. is cited to show a related apparatus that employs one band of wavelengths on one path and another non-overlapping band of wavelengths on another path.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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